

**REMARKS**

**GENERAL REMARKS**

By the above amendments, Applicants have rewritten the claims to define the invention more particularly and distinctly so as to overcome the 35 U.S.C. §102 and 103 rejections.

In light of the above amendments, the Applicants believe that the present application is in condition for allowance. Favorable action by the Examiner is respectfully solicited.

**35 U.S.C. §112 ¶2**

The Examiner rejected Claims 4, 6, and 9 because the terms “desirable distance ‘upstream’ from the production well” (Claim 4), “in a manner to achieve desirable reactions” (Claim 6), and “such as” (Claim 9) are allegedly vague and indefinite as to the limitations intended. The claims have been amended to more particularly and distinctly claim the subject matter which the Applicants regard as the invention.

**35 U.S.C. §102(b)**

Claims 1,2, 4-6, 8 and 9 were rejected by the Examiner as allegedly anticipated by **Martinell** (5,362,400). The Examiner claims that **Martinell** discloses reducing the level of iron and manganese, via oxidation and precipitation, in an aquifer by injecting an oxygen-containing gas into the aquifer with a plurality of injection wells arranged around a production well.

**Martinell** has been distinguished by amendment of claim 1. **Martinell** describes the creation of an oxidation and precipitation zone between a number of injection wells arranged around one or more extraction wells. The process is characterized in that the zone is created between a pair of adjacent injection wells by introduction of an oxygen containing gas AND

pumping the water in one well from below upwards while pumping the water in the other well from above downwards. As such, at a minimum, a pair of injection wells are required and they operate dependently to create the oxidation and precipitation zone. The amended claim requires that the aeration well operates independently of any other aeration wells.

35 U.S.C. §102(a)

Claims 1, 3, and 13-15 were rejected by the Examiner as allegedly anticipated by **Kerfoot** (2003/0029792). The Examiner claims **Kerfoot** discloses injecting an oxygen containing gas into an aquifer with a fine bubble diffuser as required by claims 1 and 3.

Claims 1 and 3 have been amended to distinguish them from **Kerfoot**. **Kerfoot's** invention utilizes the injection of an aerosol, i.e. "microbubbles comprising a gas, coated with a thin layer of liquid compounds" at ¶3 in **Kerfoot**. Applicant's invention utilizes fully dissolved gases which diffuse, advect, and disperse from the aeration well into the surrounding aquifer. As such, bubbles do not enter the formation which has negative impact on the aquifer.

Further, **Kerfoot** allegedly suggests adding an oxygen containing gas and ferrous irons through aeration wells or separate delivery wells as required by claims 13-15.

Applicants have amended claim 13 to distinguish claims 13-15 from **Kerfoot**. **Kerfoot** injects aerolized liquid particles which may include oxidants such as ferrous ions but does not, as disclosed by the Applicants, strip O<sub>2</sub> from the water in the well casing with an inert gas, inject Fe<sup>2+</sup> solution allowing sufficient diffusion time, and then inject O<sub>2</sub>. As amended, **Kerfoot** does not read on claims 13-15.

35 U.S.C. §103(a)

Claims 3, 7, and 10-12 were rejected as unpatentable over **Martinell** in view of **Kerfoot**. The Examiner states that **Martinell** discloses the claimed invention with the exception of the type of diffuser employed. **Kerfoot** allegedly teaches the fine bubble type diffuser. In combination, the Examiner alleges one of ordinary skill would substitute **Kerfoot**'s diffuser for the gas diffuser of **Martinell** because of the advantages of the former diffuser.

The claims, as amended, are no longer obvious in light of the combination of references because they no longer teach or suggest all elements of the claimed invention as amended. Namely, they no longer teach modification of ground-water chemistry by advection, diffusion, and dispersion of a fully-dissolved gas. Further they do not teach that the aeration well operates independently of other aeration wells.

A person having ordinary skill in the art would read **Martinell** as requiring a pumping means operating dependently on two injection wells and **Kerfoot** as teaching the use of aerosols (liquid coated gas particles). Further, **Kerfoot** teaches injecting bubbles which enter the aquifer itself as bubbles. These non-dissolved gases have a negative impact on aquifers. Applicants have remedied this problem because Applicants disclose and claim an invention in which gas enters the aquifer fully dissolved. **Martinell** requires the use of supplemental pumps to provide the proper groundwater flow rate. Applicant's invention does not require the use of supplemental pumps and relies on the natural ambient groundwater flow rate to supply the hydraulic gradient. Combined, these references do not teach all elements of Applicant's invention and claims.

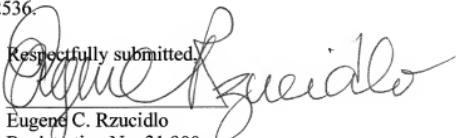
**AUTHORIZATION**

If the Examiner believes that issues may be resolved by telephone interview, the Examiner is respectfully urged to telephone the undersigned at 212 309 1214. The undersigned may also be contacted by email at [gcr@hunton.com](mailto:gcr@hunton.com).

No additional fee is believed to be necessary. The commissioner is hereby authorized to charge any additional fees which may be required for this amendment, or to credit any overpayment to Deposit Account No. 50-2536.

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By: Respectfully submitted,



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